



Impacts of marine plastic pollution from continental coasts to subtropical gyres – Fishes and other vertebrates in the SE Pacific.

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This talk

The Problem
(distribution
and sources)

The Impacts
(fish & foes)





The problem

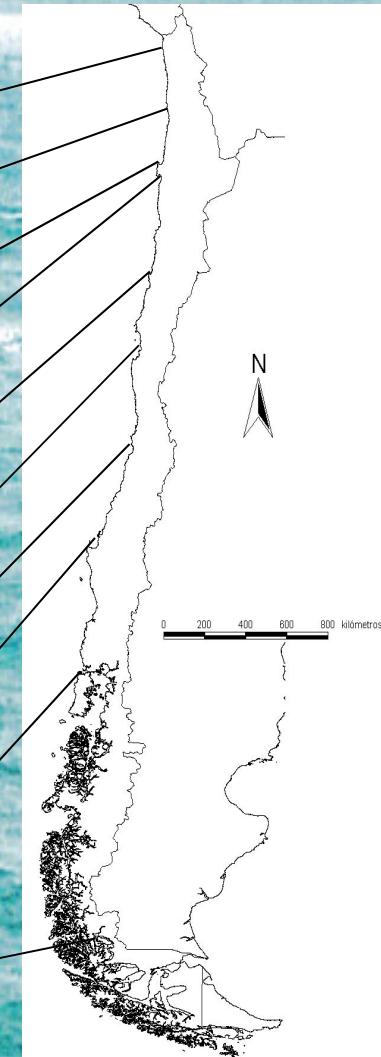
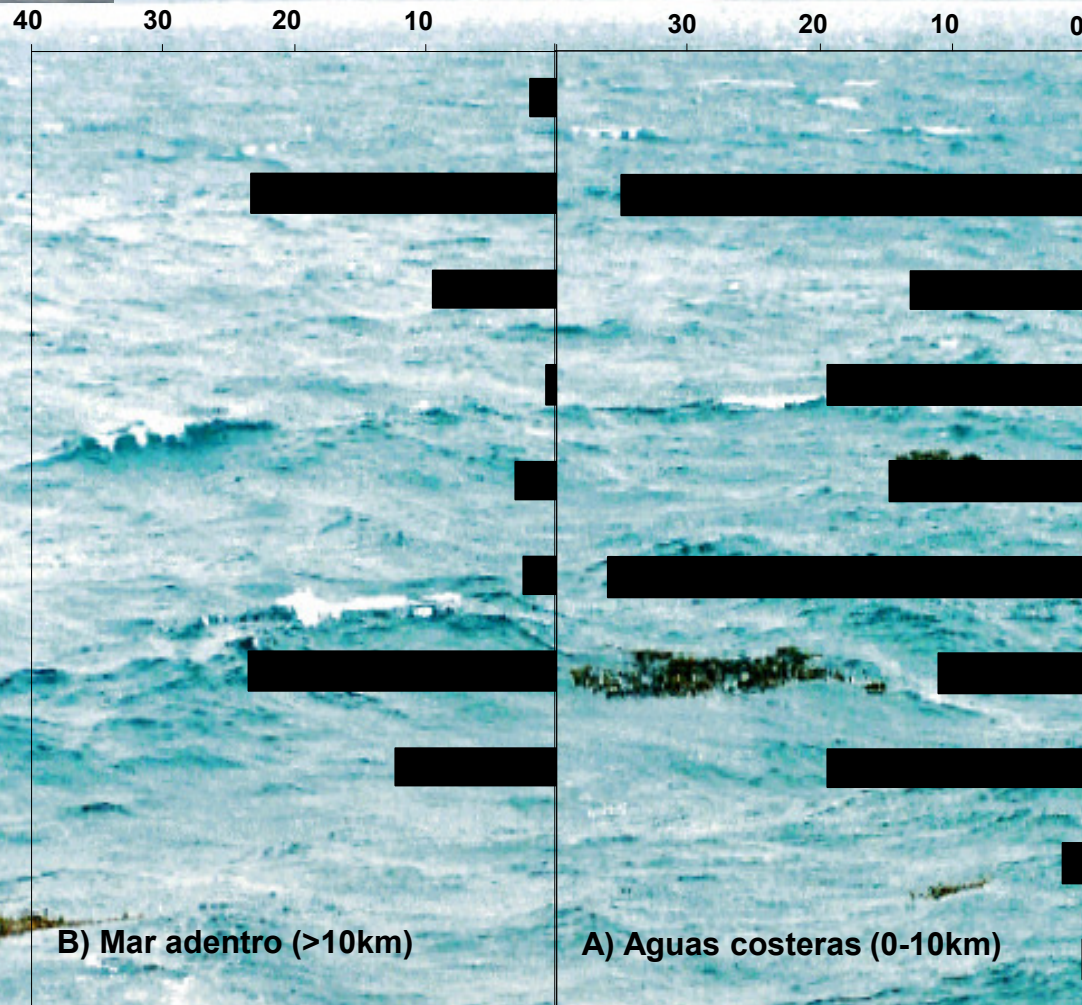


Foto: Diego Miranda

Distribution & Sources



Floating Litter (items km⁻²)



Local Sources

Thiel et al. 2003





Científicos de la Basura en la Playa

Research & Education Alliance



2007-2018

¿What is out there?





¿Where does it come from?

Local Sources



Red Nacional de Investigación Escolar

30 – 50 schools
covering the entire
coast of Chile

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat



Image IBCAO

Image Landsat

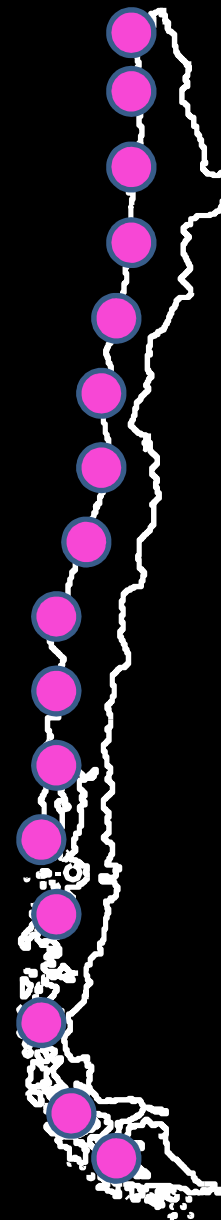
Data SIO, NOAA, U.S. Navy, NGA, GEBCO



¿Which are the dirtiest (cleanest) beaches of the Chilean coast?

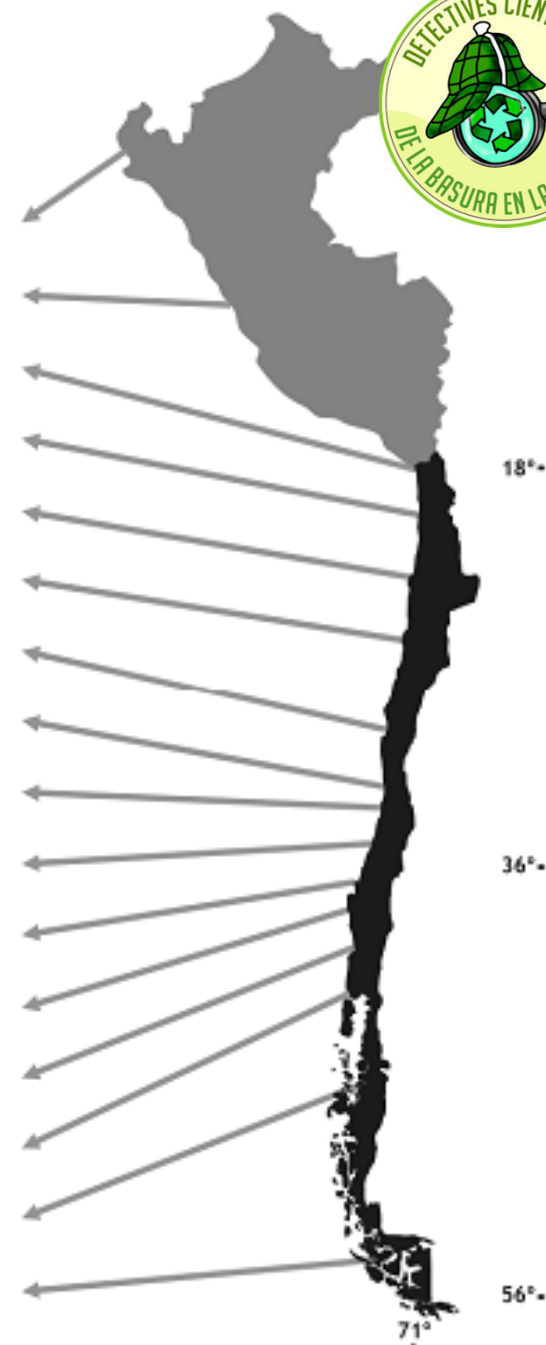
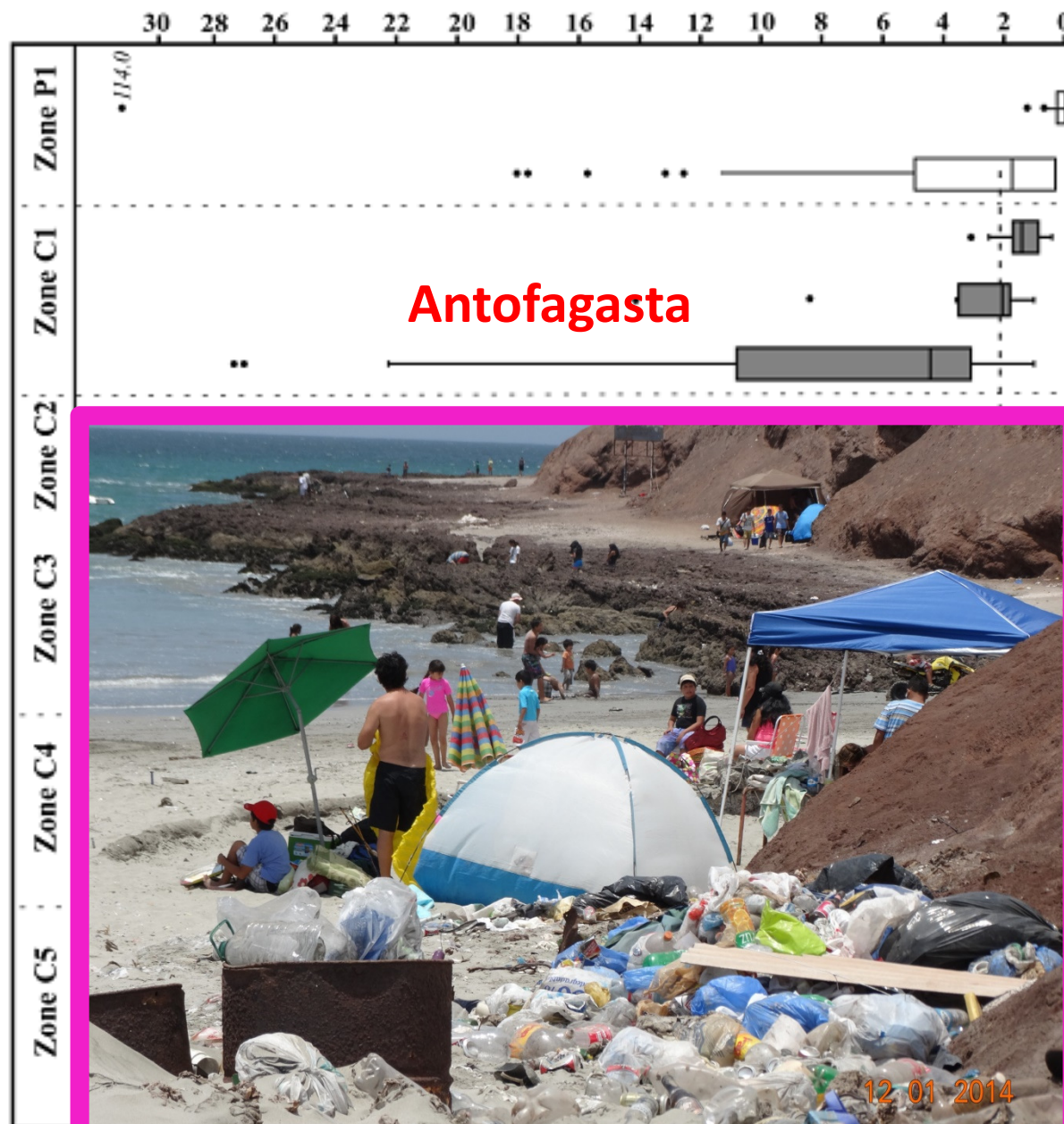


2008, 2012 & 2016





Densities of AMD (Items m⁻²)







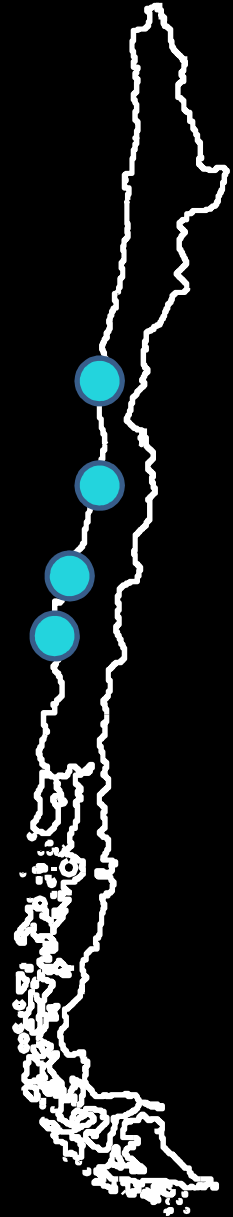


Local Sources



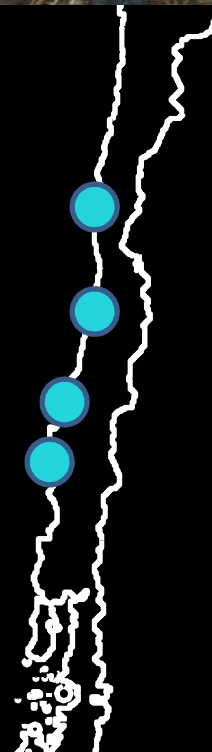
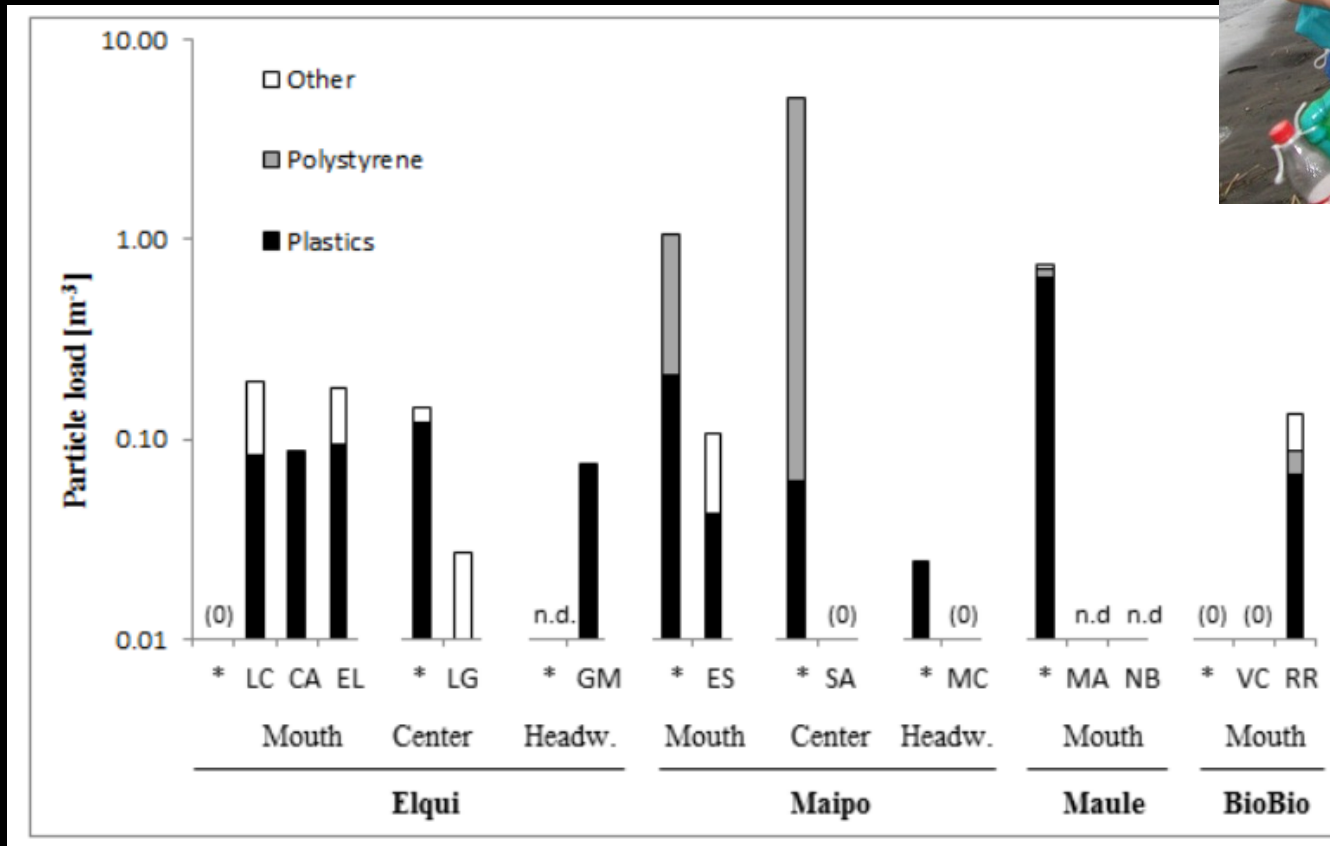


¿Do the rivers also
transport litter to the sea?





Plastic particles per hour



¡Yes! Rivers bring litter to the sea!!

**Local
Sources**



See also Rech et al. 2014 in Marine Pollution Bulletin

The fjords in southern Chile



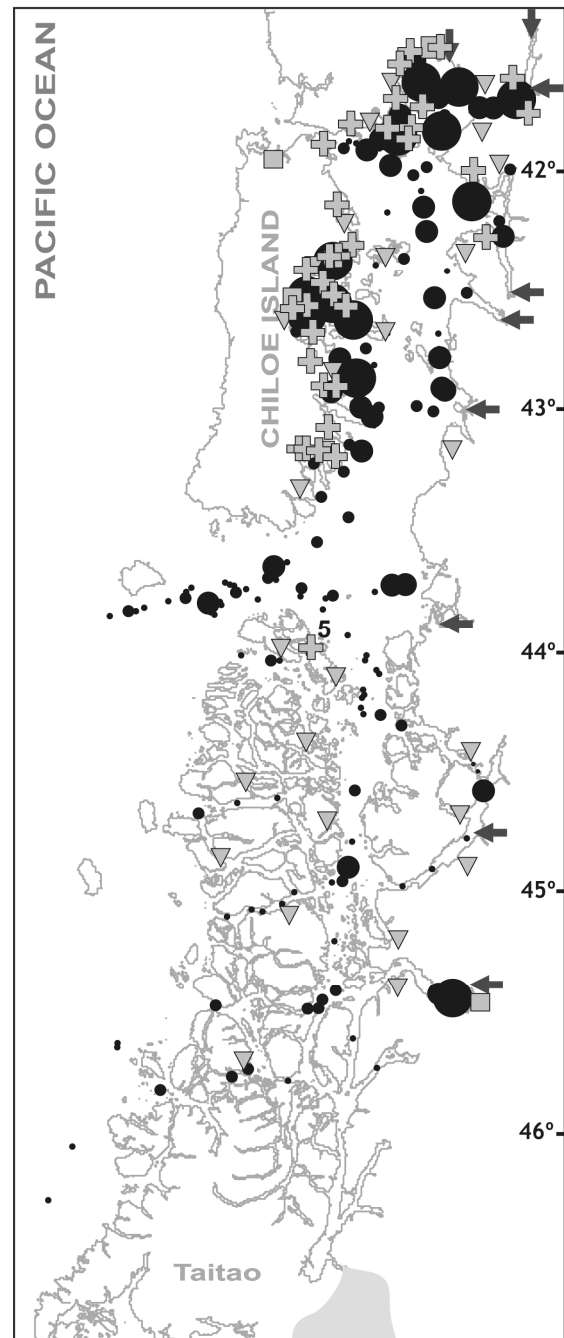
Cruceros CIMAR-FIORDO



Surveys at Sea

Floating objects

Floating debris



▼ Salmonids + Bivalves ■ City ← River

• 0 • 0.1 - 10 • 10.1 - 30 • > 30 items km⁻²

Local Sources

Isla de Pascua



08/11/2014

Clasificado los ítemes



20/11/2014

Percent items from Industrial Fishery

Colegio San Sebastian: 56.4%

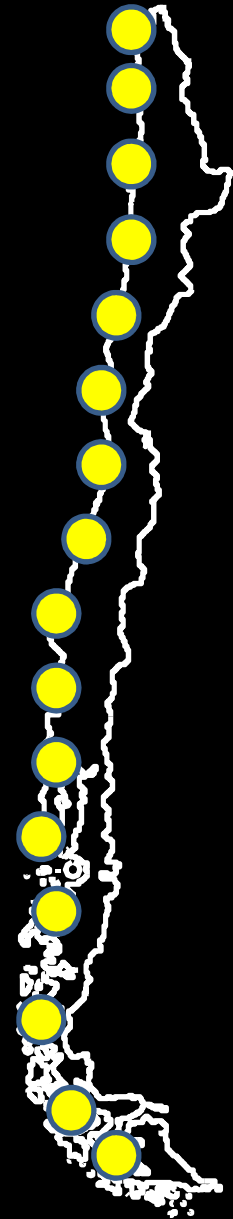
Colegio Aldea Educativa: 70.1%



Distant Sources

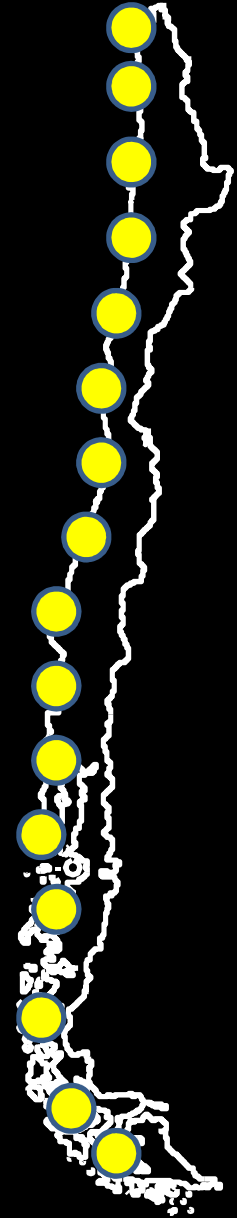


¿What happens to the litter in the sea?



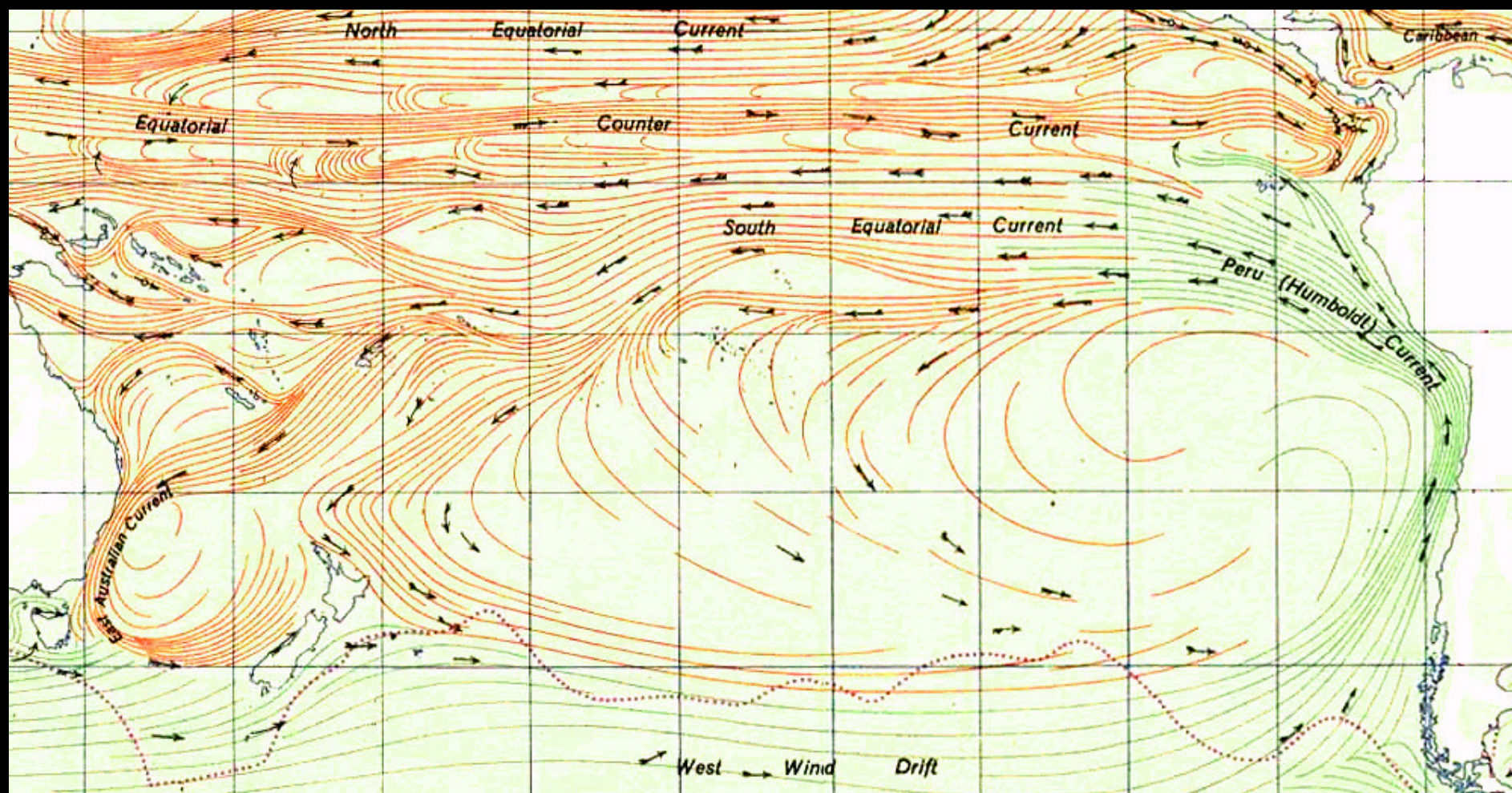


¿Sink or float?

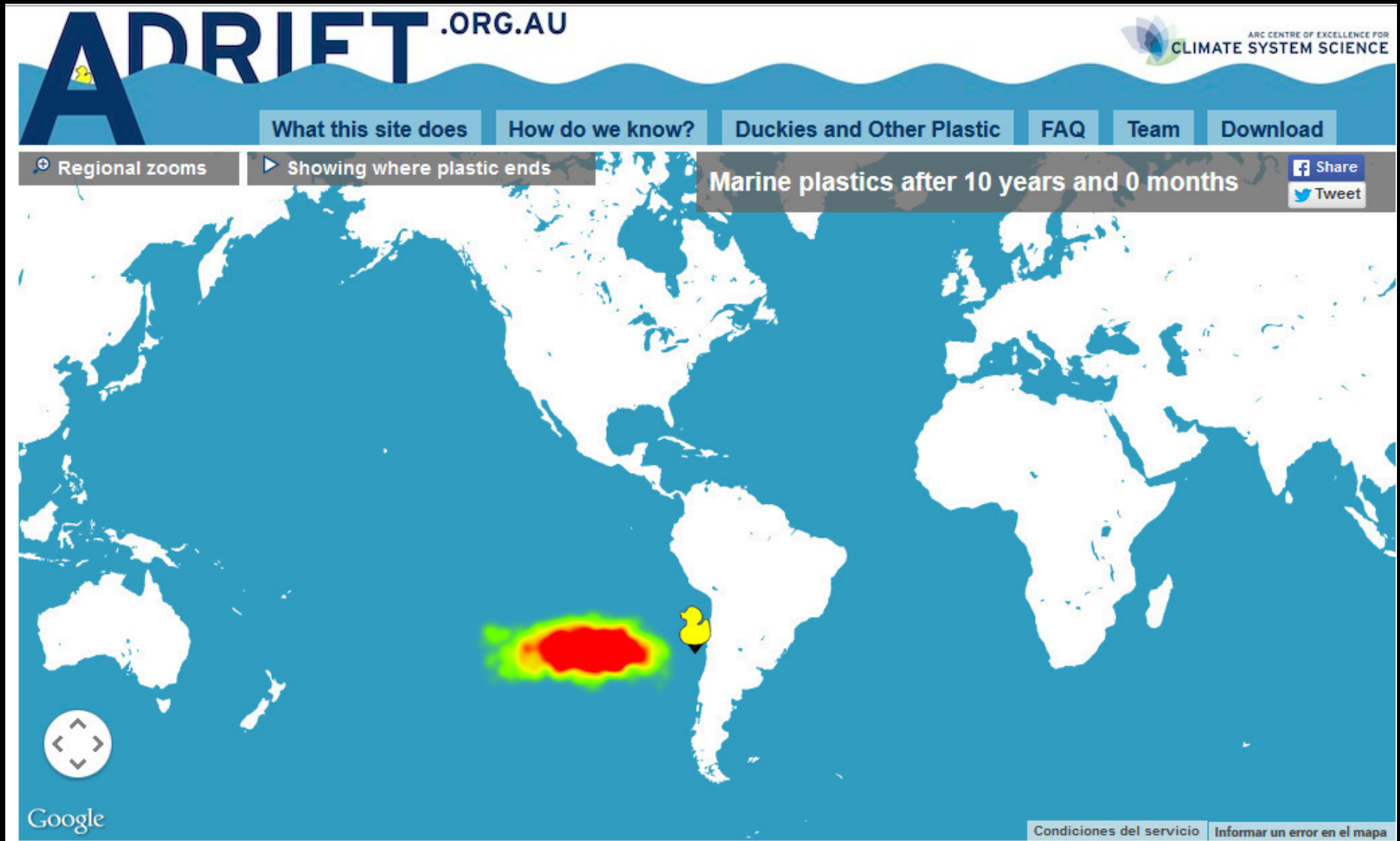




If it floats it goes with the currents



¡A long trip (several years)!



¿What happens during the trip?

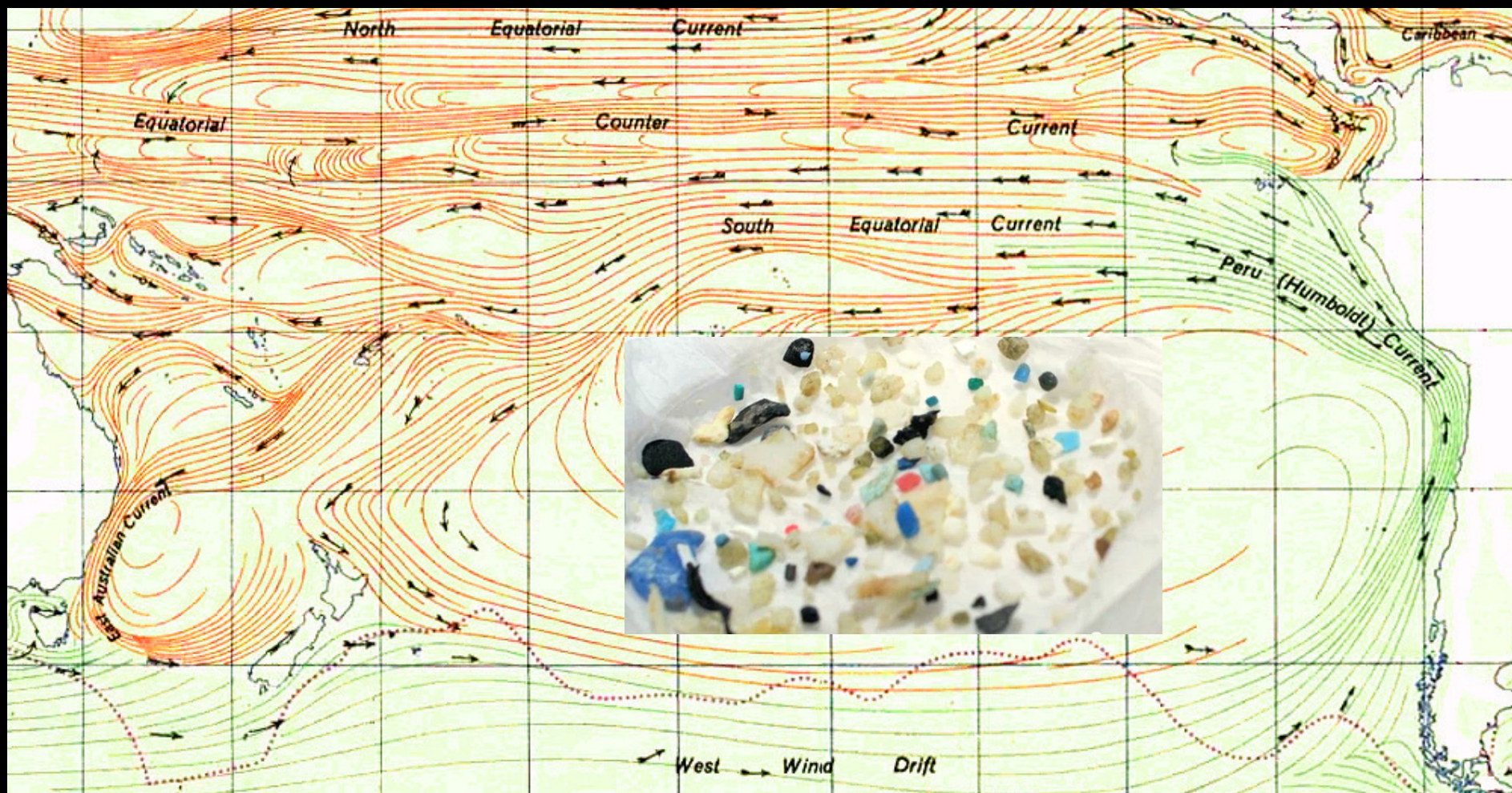


¡Plastics fragment into small pieces!



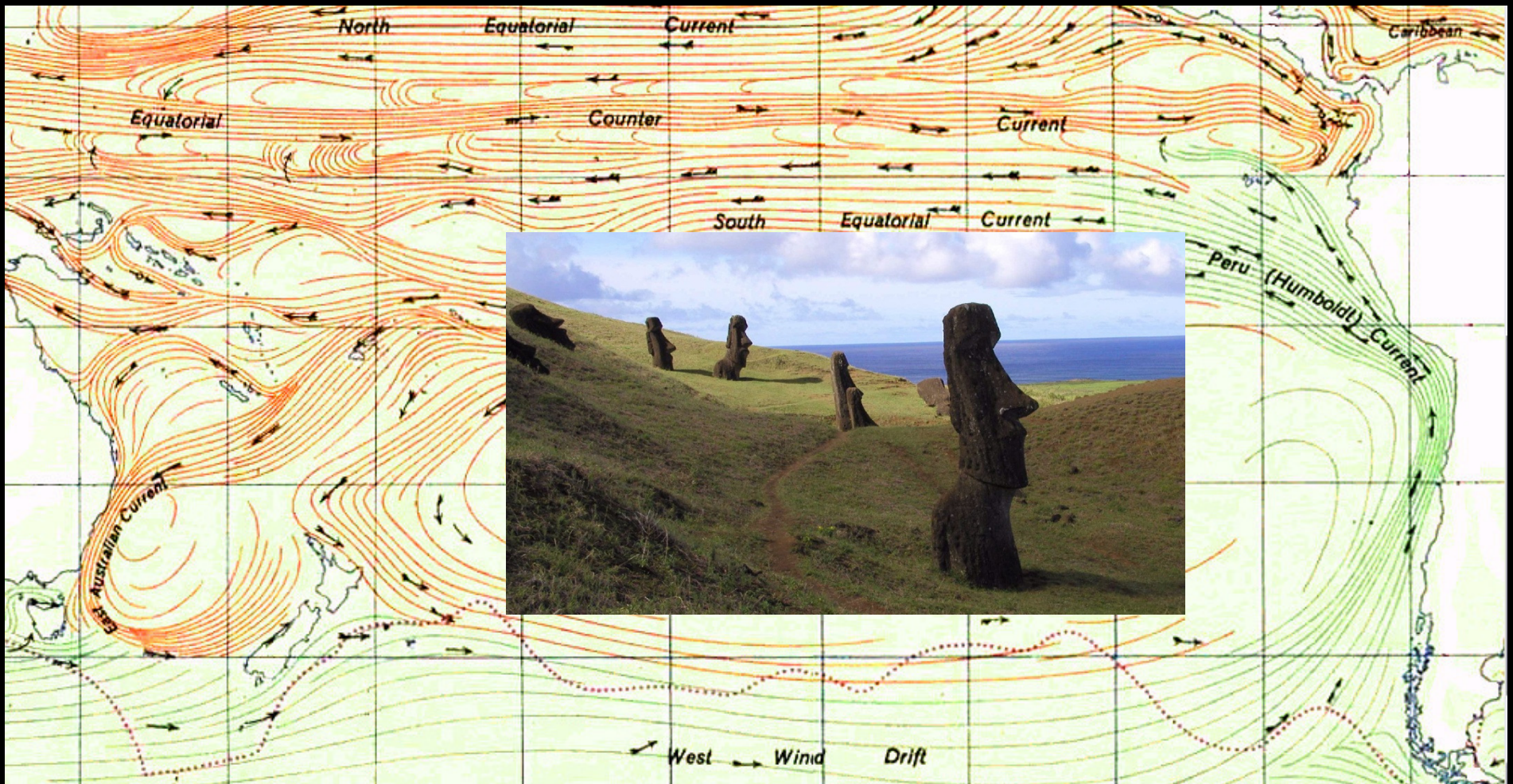


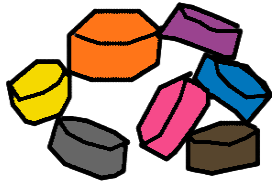
¿Where should we have many plastic fragments?





Rapa Nui



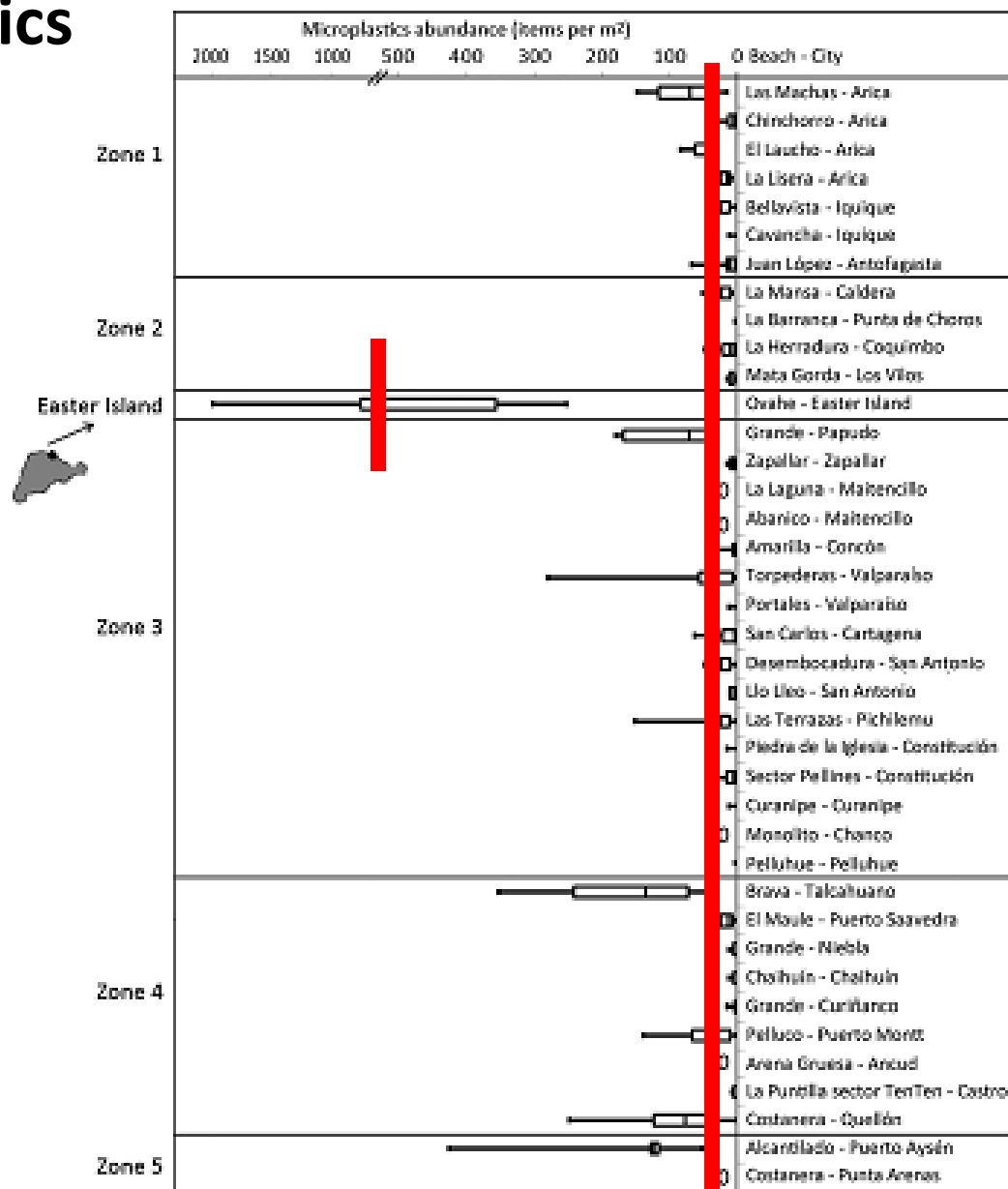


Small plastics

Sampling
(October – November 2011)



Small Plastics

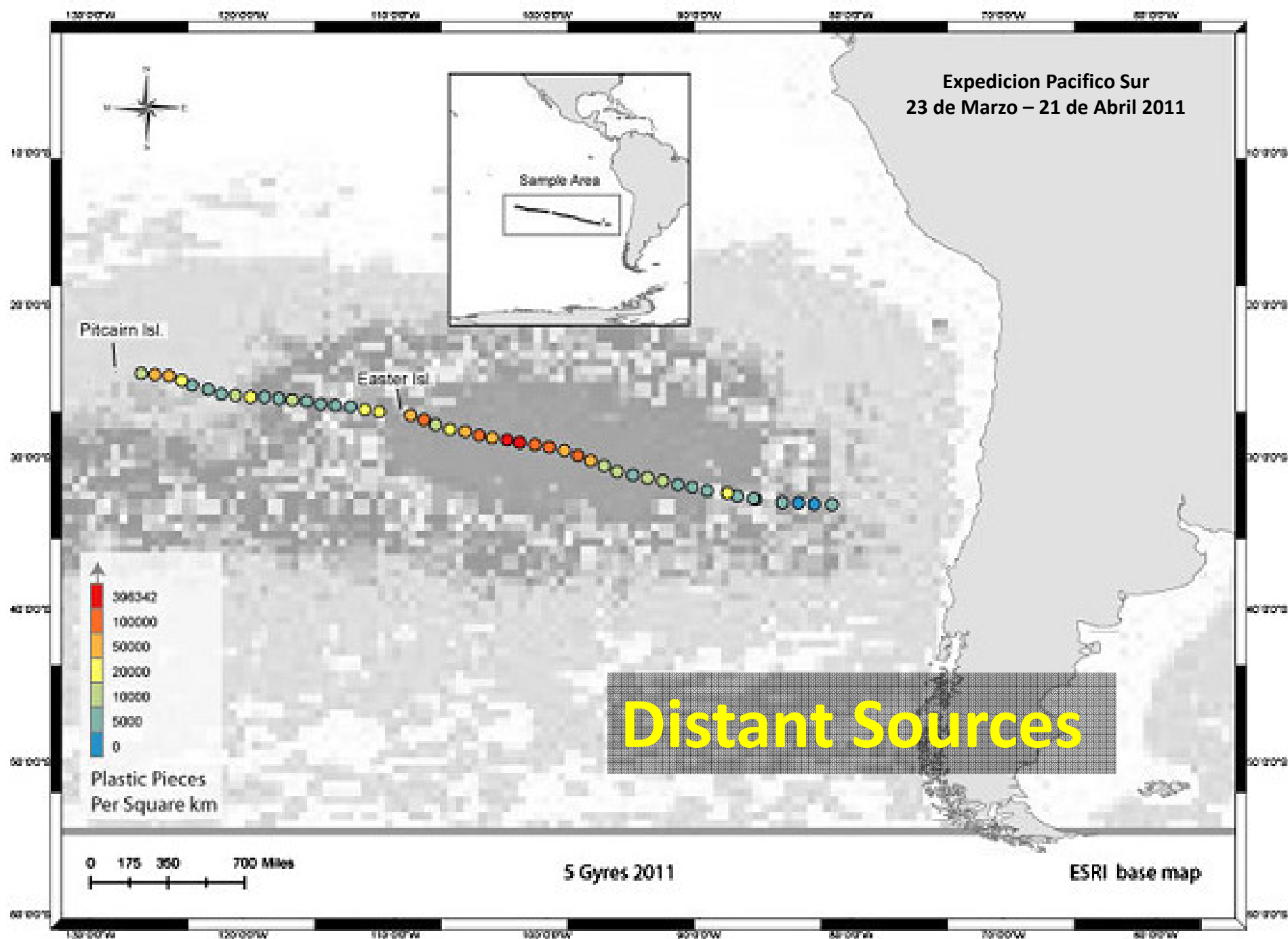


Hidalgo Ruz & Thiel 2013



Marcus Eriksen
(5 Gyres Institute)

**South Pacific
Expedition**
(23 March – 21 April 2011)





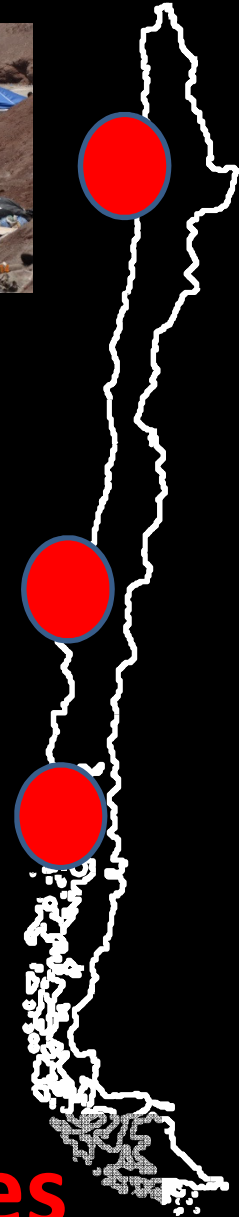
The Problem (distribution and sources)



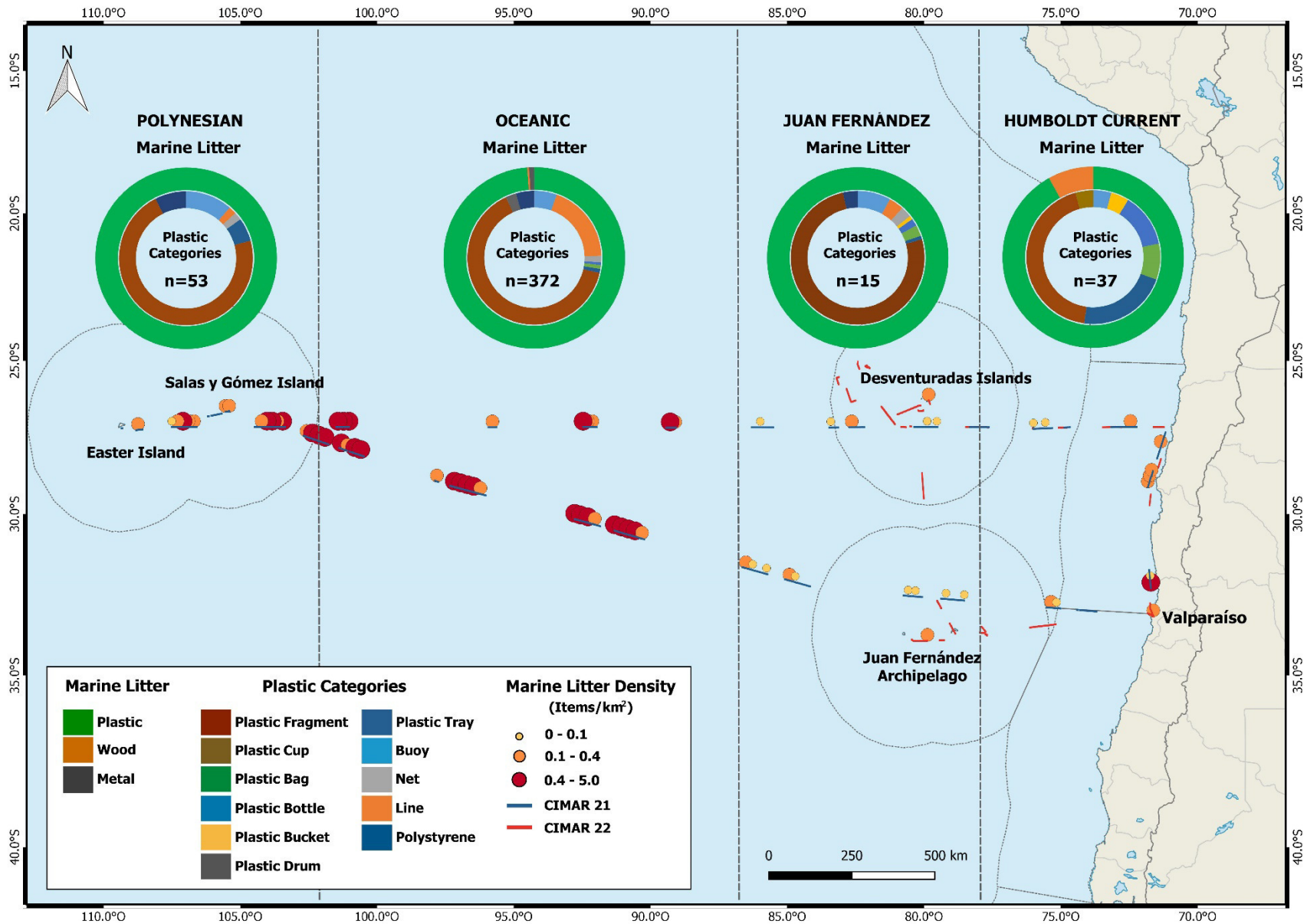
Distant Sources



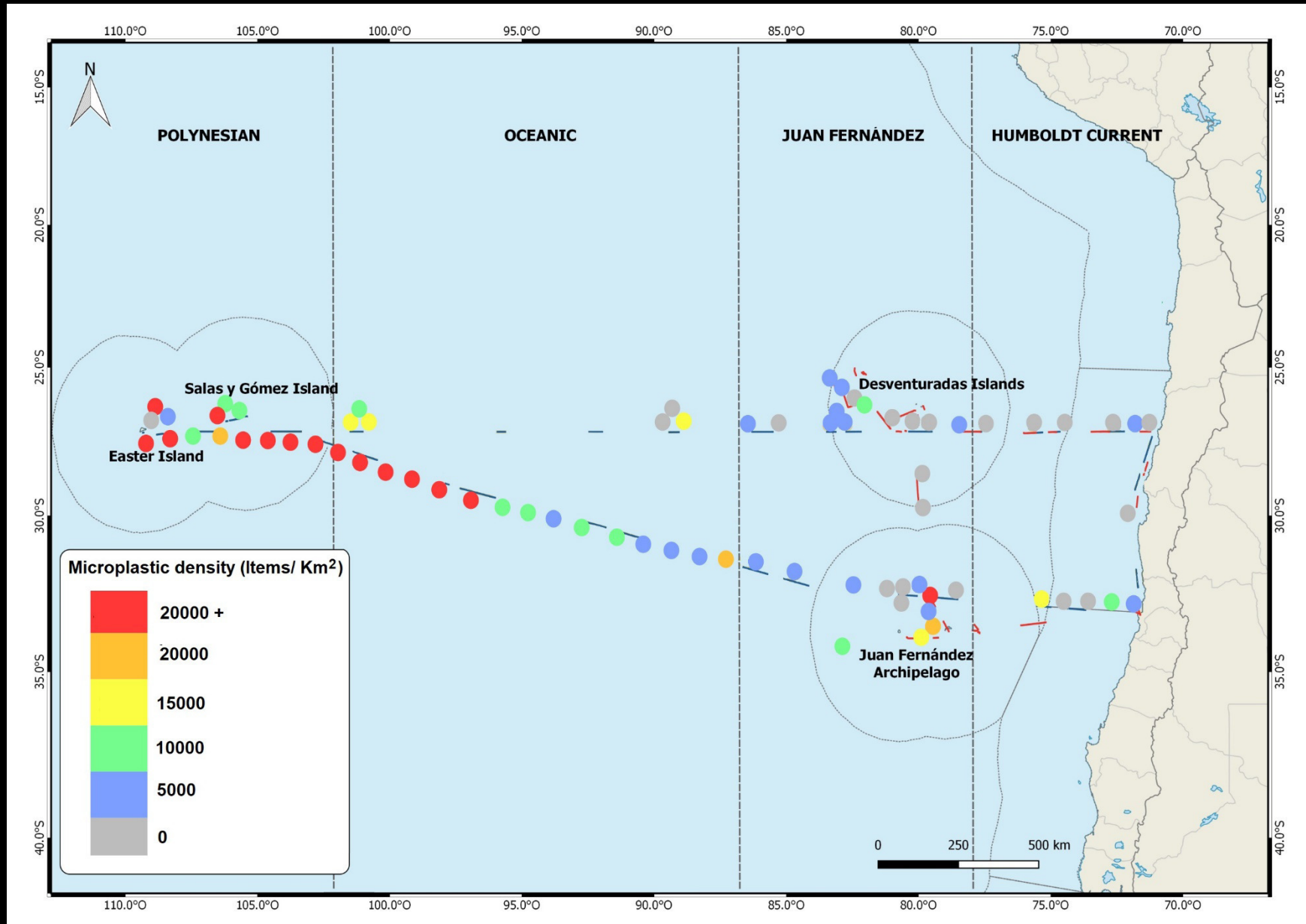
Local Sources



Summary: Macroplastics



Summary: Microplastics





The Impacts



**Fishes,
Turtles,
Seabirds,
Mammals**

Young frigatebird entangled and dead on nest;
Foto: Camila Gallardo

¿And the impacts?

Fishes, turtles, seabirds, mammals

Nothing known – disperse information

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Collate all reports



Naiti Morales



Claudio Godoy



Carlos Guerra



Pedro Valenzuela

Interactions with plastic reported

	Species (n)
Fishes	20
Turtles	5
Seabirds	53
Mammals	19

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Fishes



Naiti Morales



Carlos Canales

Entanglement

Open Ocean: 3
Continental coast: 0

Ingestion

Open Ocean: 5
Continental coast: 20

OJO: oceanic fishes with
high incidences!!!

Turtles



Camila Gonzalez



Carlos Guerra

Entanglement

Open Ocean: 3

Continental coast: 3

Ingestion

Open Ocean: 2

Continental coast: 3

OJO: most species suffer from both!!!

Seabirds



Andres Pujgros

Entanglement

Open Ocean: 7

Continental coast: 17

Ingestion

Open Ocean: 31

Continental coast: 8



Matias Portflitt

OJO: Very high concentrations in oceanic species!!!

Mammals



Juan Valqui

Entanglement

Open Ocean: 0

Continental coast: 18

OJO: entanglement with fishing gear!!!



Macarena Bravo

Ingestion

Open Ocean: 0

Continental coast: 1

97 species from the SE Pacific with plastic interactions



Naiti Morales



Claudio Godoy



Carlos Guerra



Pedro Valenzuela

Many species with both (entanglement & ingestion)



Naiti Morales



Claudio Godoy



Carlos Guerra



Pedro Valenzuela

Sea turtles suffer most (entanglement & ingestion)



Carlos Guerra

Sea turtles suffer most (high percentages of individuals)

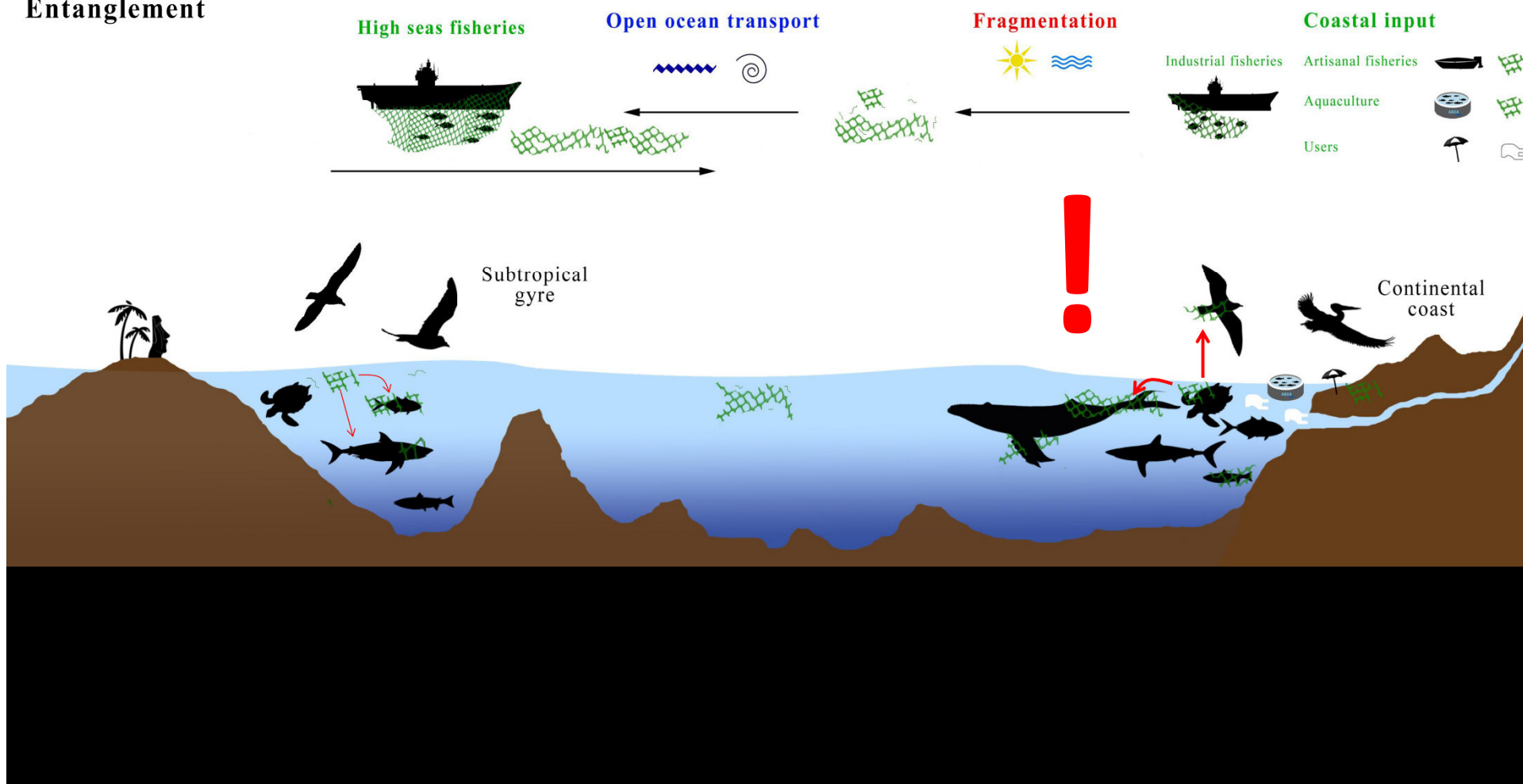


Carlos Guerra



Summary: Entanglement

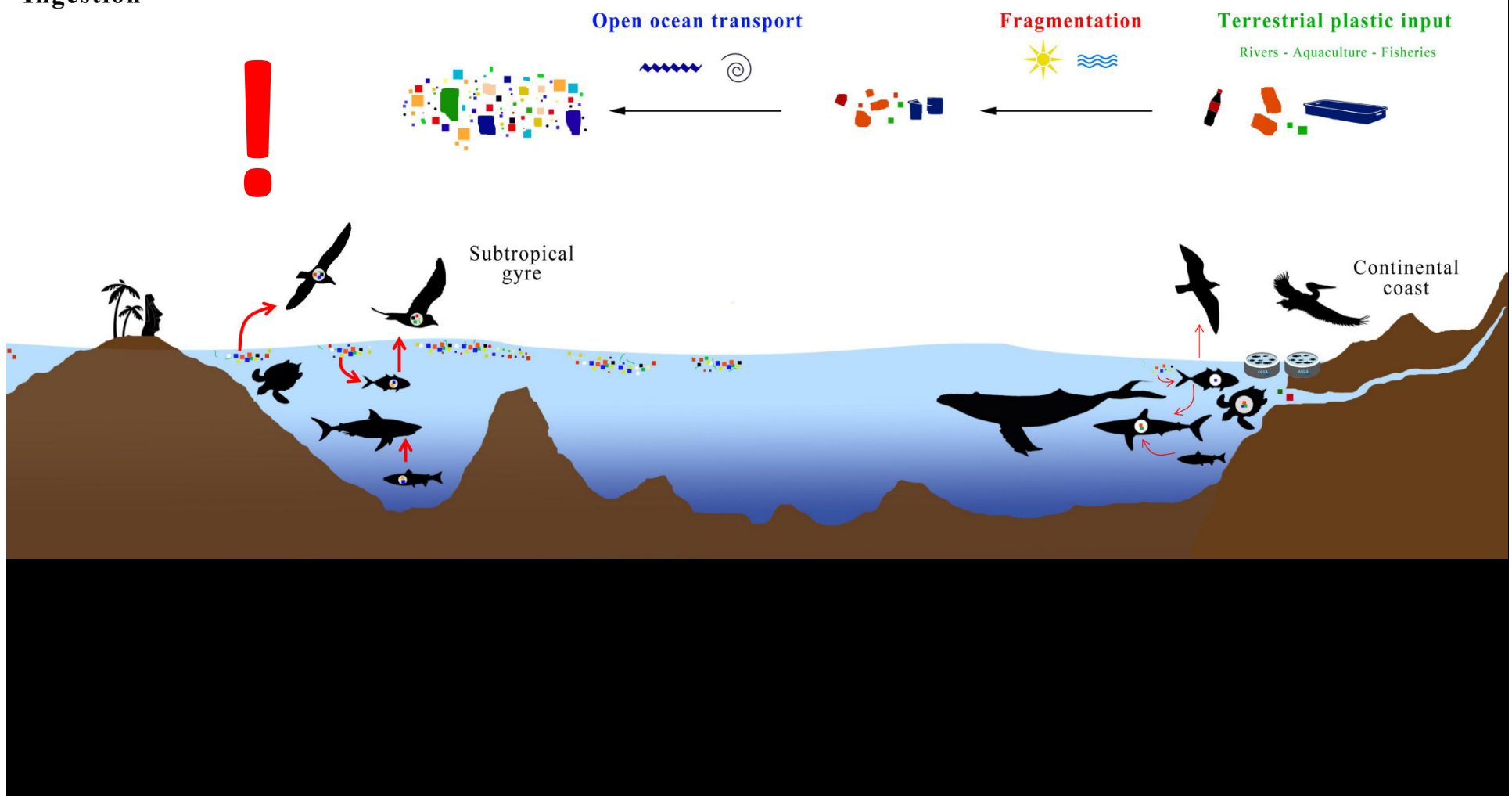
Entanglement



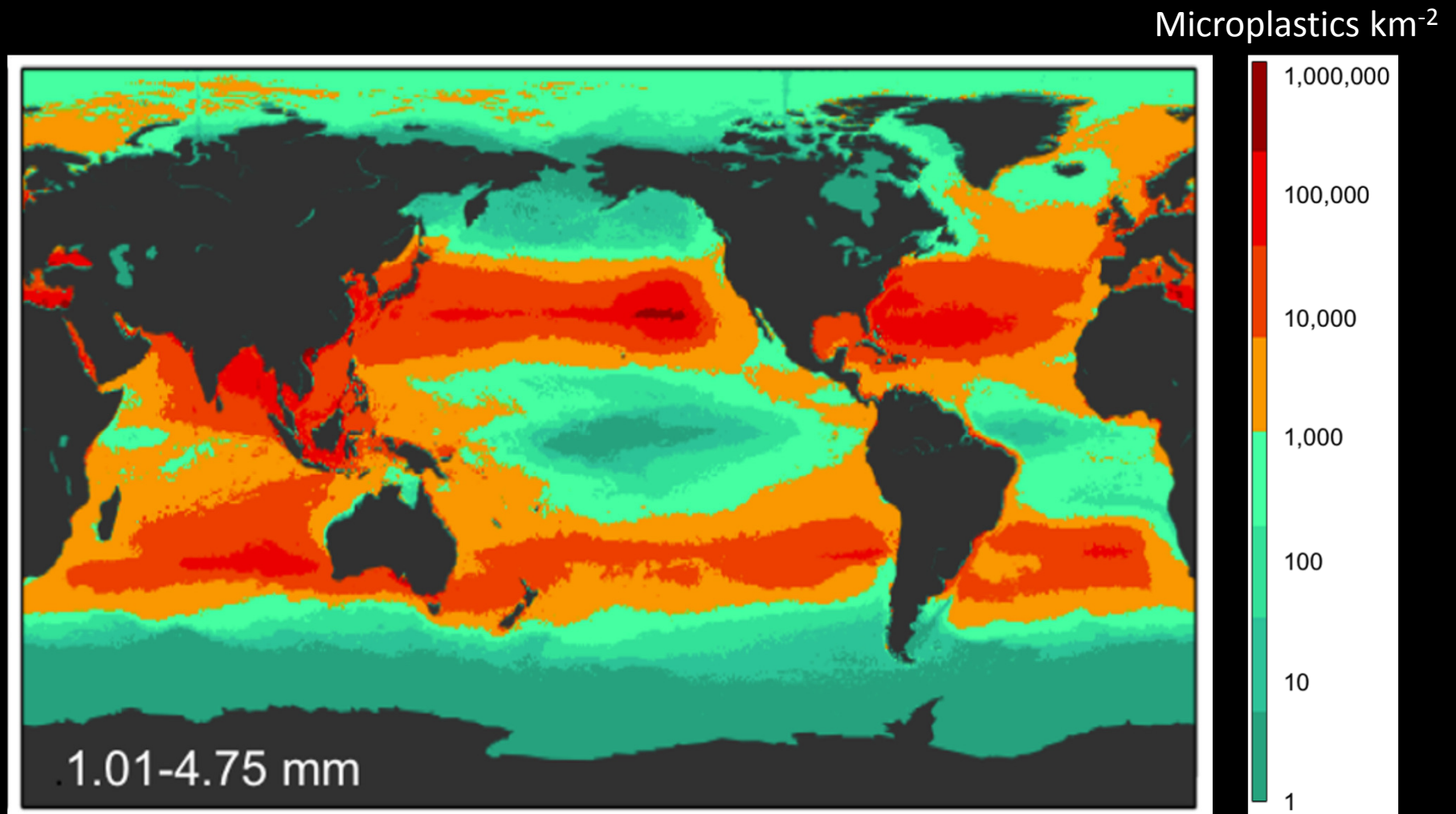


Summary: Ingestion

Ingestion



What happens in the S Pacific happens everywhere!



Eriksen et al. 2014



It's high time!!!



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Take Action!!!



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Fire place on Rapa Nui



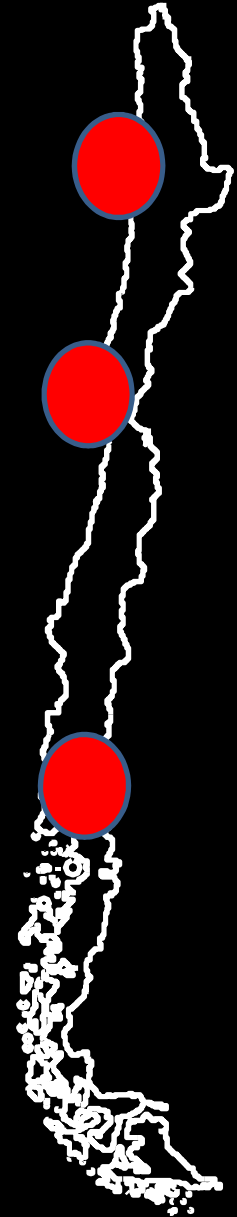
Fire place near Pto. Montt



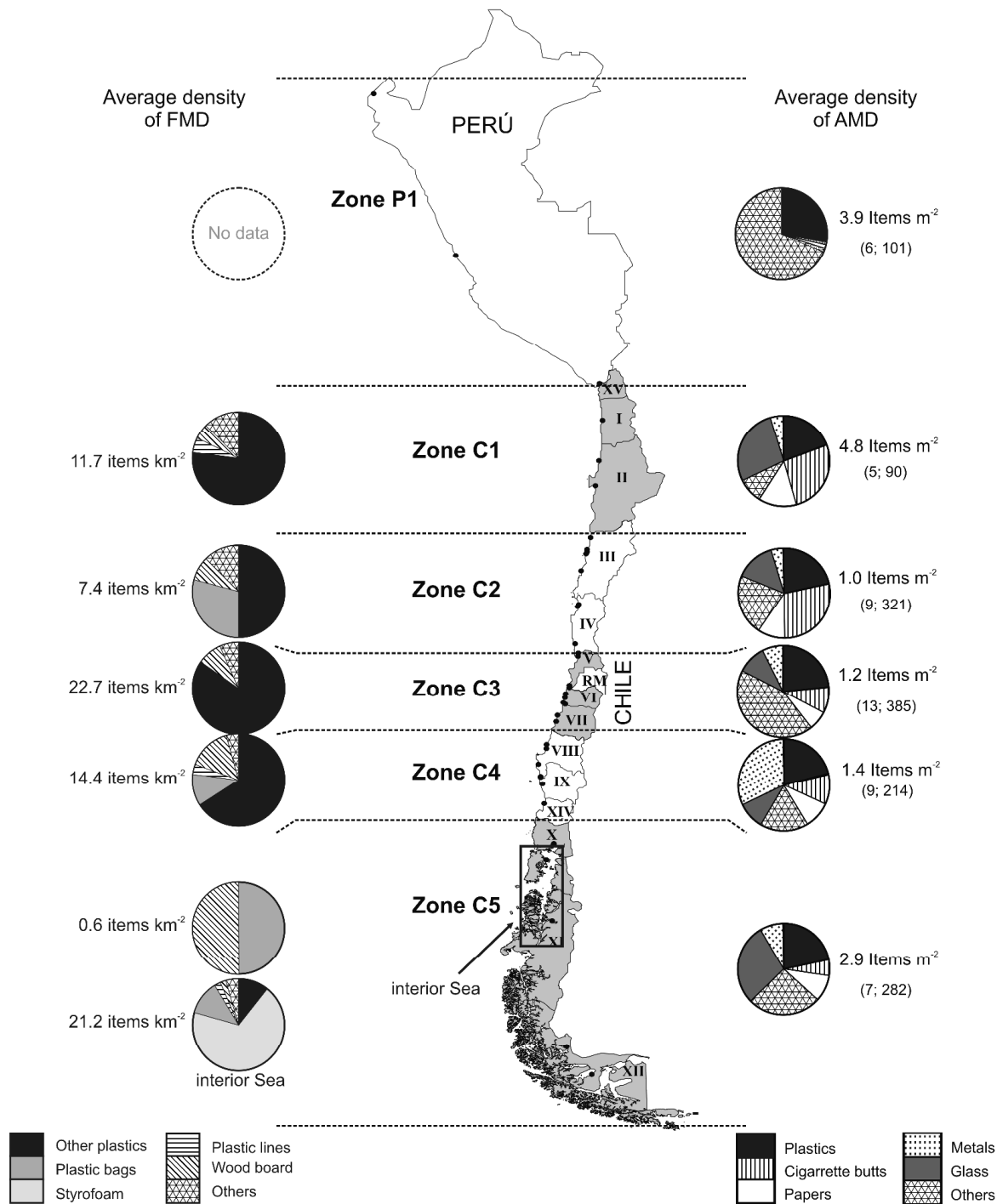
Litter & Nature



Ensure meaningful
nature experiences!





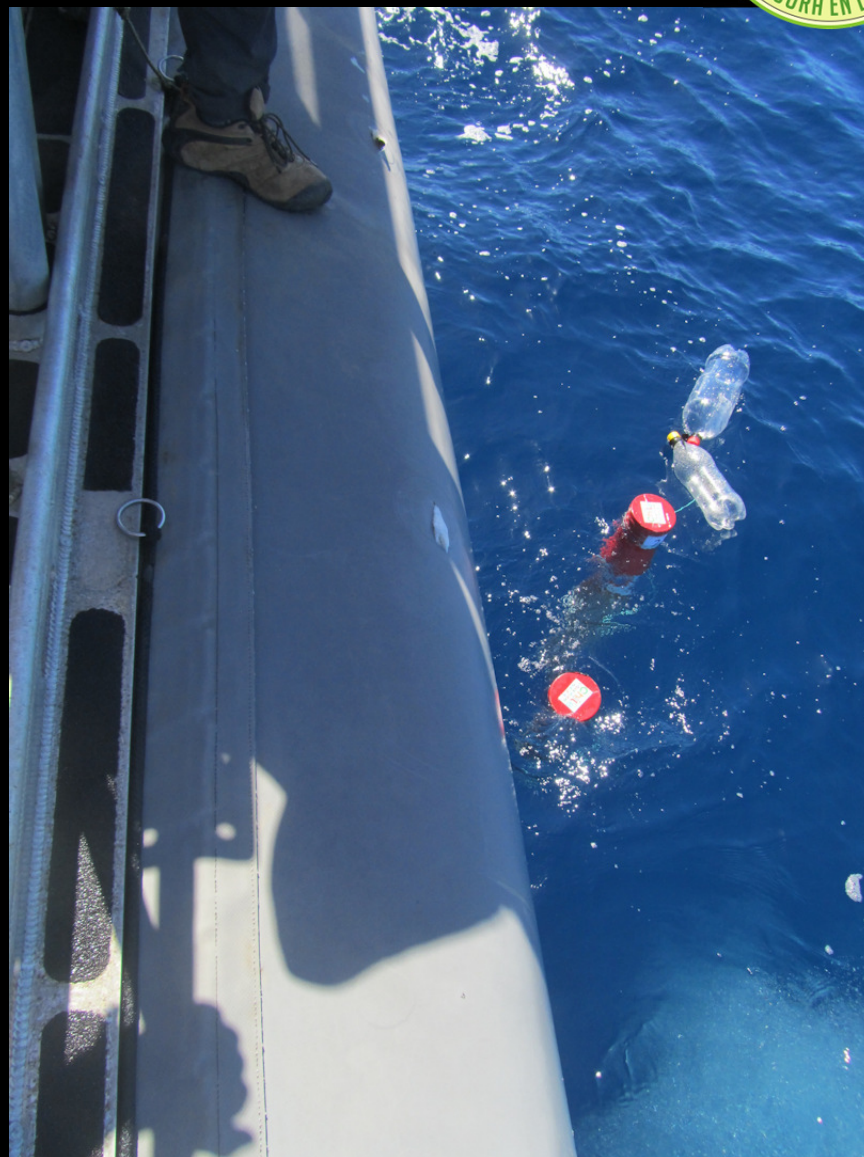


Plásticos dominan

En las playas una alta proporción de vidrio & metales

De usuarios de playas

Released on 10 January 2014





Floating for 90 días





7 April 2014



10 January 2014

Antofagasta
Taltal
Chile
Copiapó
Vallenar
La Serena
Ovalle
San Juan
Los Andes
Mendoza
Valparaíso
Quilpué
San Antonio
Melipilla
Rancagua
Santiago

¡A long trip (several years)!



Try it yourself!